the target sites and formation of a DNA quadruplex. As a result, target sequences are accessible for the next round of priming and DNA amplification proceeds under isothermal conditions. QPA can proceed in either a linear or an exponential amplification mode. Experiments here demonstrate that linear QPA has a potential to be highly specific. We have combined linear QPA with nicking enzymes to reach the level of exponential signal amplification.
In our assays we use specifically designed probes that are complementary to both pathogen and QPA template. When the probe is annealed to the pathogen DNA and the nicking site is folded, the enzyme nicks the pathogen strand and creates the 5'-overhang or primer/template complex, which is elongated by polymerase. At this point the nicking enzyme and polymerase initiate QPA template production, which later binds to QPA primers and produces signal. We will discuss thermodynamic and kinetic bases of these multi-step reaction, which can be conducted isothermally between 55 and 65 °C. *Supported by Bill & Melinda Gates Foundation.*

402-Pos Board B171
The Localization and Mobility of MSH2 in Cells Undergoing Neoplastic Transformation
Justin L. Sigley, Anita McCauley, Keith Bonin.
Wake Forest University, Winston-Salem, NC, USA.
Genome instability is an underlying factor of all cancers. Defects in DNA repair mechanisms contribute significantly to this factor. Recent reports indicate the mechanical properties of cells change as they advance through different stages of neoplastic transformation. The main goal of this study is to investigate how changes in the intracellular environment and changes in DNA repair protein distribution are altered in cells undergoing neoplastic transformation. For this study we have chosen to use human mammary epithelial (HME) cells from the Weinberg line. Lipofection was used to transiently transfect enhanced green fluorescent protein (egfp) fusions to MSH2 mismatch repair proteins. We have measured the localization and diffusion of these fusions using fluorescence recovery after photobleaching (FRAP) and raster image correlation spectroscopy (RICS) on live cells maintained under appropriate environmental conditions. We have tested normal, immortal, and tumorigenic cells in this study. The acquired data was analyzed using custom written Matlab programs as well as commercially available software. Preliminary results show localization of the fusions to the nucleolus in all cell types tested. The surrounding nucleus generally has the weakest localization signal. We have also observed smaller diffusion coefficients in the nucleus of tumorigenic cells compared to normal cells. This work is supported by NSF Materials and Surface Engineering grant CMMI-1152781.

Membrane Physical Chemistry I

403-Pos Board B172
Characterization, Physicochemical Properties and Transport Studies of Newly Synthesized Polystyrene Blended Inorganic-Organic Nanocomposite Membrane
Rafiuddin Rafiuddin, Md. Ramir Khan.
Aligarh Muslim University, Aligarh, India.
A nanostructured polystyrene based inorganic-organic composite membrane has been synthesized by sol-gel method under acidic conditions. Investigation on the electrochemical properties showed that higher membrane potential was observed in case of LiCl than other electrolytes used such as NH_4Cl, KCl and NaCl for the nanocomposite membrane. Effective fixed charge densities were evaluated from the measured potential and were found to follow the order $Li^+ > NH_4^+ > K^+ > Na^+$. The permselectivity, ionic mobility ratio and counter-ion transport number of the composite membrane have also been calculated which suggest that the inorganic-organic nanocomposite membrane is more cation-selective towards Li^+ ions; however the selectivity increases with dilution for all monovalent electrolytes. These membranes were comprehensively characterized for their physicochemical properties, morphology, molecular interactions, crystalline nature and thermal stability by water uptake and porosity studies, scanning electron microscopy (SEM), Fourier transform infrared (FTIR), X-ray studies, thermogravimetric and differential thermal analyses (TG-DTA). The ion-exchange capacity, volume void porosity and water uptake of the membrane were found to be highly dependent on polystyrene content in the membrane phase and these properties decreased with increase in the amount of the organic polymer.

404-Pos Board B173
Mechanical Signals in Nerves during Action Potential Propagation
Alfredo Gonzalez-Perez, Thomas Heimburg.
Niels Bohr Institute, Copenhagen, Denmark.
We investigated the action potential and the increase in nerve diameter associated with the signal transmission. Combining electrophysiological methods and Atomic Force Microscopy we obtained the electrical and mechanical signal associated to the nerve transmission. The results were discussed in the contest of the soliton model developed by Heimburg and Jackson [1] as an alternative to the Hodgkin and Huxley model for signal propagation in nerves [2]. The experiments have been performed using the ventral cord of earthworms (Lumbricus terrestris) that were previously anesthetized for dissection and nerve extraction. The protocols used in our experiments follow the general approach in previous experiments by Tasaki et al. [3] and Kim et al. [4].
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405-Pos Board B174
The Effect of Electrical Polarizabilities of Solutes on Lipid Membranes
Ryan Z. Lybarger[1], Heather D. Stout[1], Krzysztof Szymanski[2], Horia Petrache[1].
[1]Indiana University Purdue University Indianapolis, Indianapolis, IN, USA, [2]University of Bialystok, Bialystok, Poland.
In aqueous solutions, neutral lipid bilayers form multilamellar lipid vesicles in which the repeat spacing is highly sensitive to water soluble molecules and ions [1]. In this work, we report and compare electrical polarizabilities [2] of two classes of zwitterionic solutes: Good's buffers and amino acids. We find that both pH buffers and amino acids are more polarizable than common monovalent ions in proportion to molecular weight. In addition, there is a clear distinction between how the polarizability values for organic molecules scale with molecular weight compared to salt ions: molecular weight dependence is almost linear for organic molecules while the dependence for salt ions is a power law with exponent 2/3. These results are used to explain the interactions between lipid membranes in the presence of solutes.
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406-Pos Board B175
Effects of Flavonols on the Magnitude of Dipole Potential of Phospholipid Bilayers
Svetlana S. Efimova, Ludmila V. Schagina, Olga S. Ostroumova.
Institute of Cytology of RAS, St-Petersburg, Russian Federation.
The changes in K^+-nonactin steady-state membrane conductance were measured to estimate the changes in the dipole potential ($\Delta\varphi_d$) of phospholipid bilayers (DOPS, DOPE, DOPC) after two-side addition of quercetin or myricetin into membrane bathing solution (0.1M KCl pH7.4). Table presents the results of the approximation of the obtained data by Langmuir adsorption isotherm. The maximum dipole potential change $\Delta\varphi_d(\infty)$ depends on flavonol and membrane types. It is larger in case of quercetin than for myricetin. This difference may be attributed to higher hydrophobicity of quercetin compared with myricetin. The smaller values of $|\Delta\varphi_d(\infty)|$ in the case of DOPS and DOPE than for DOPC may be resulted from smaller effective surface density of dipoles due to electrostatic repulsion between serine residues and negative spontaneous curvature of DOPE relative to membranes made from the phospholipid with neutral spontaneous curvature, DOPC. Comparison of dissociation constants (K) shows that flavonol affinity for DOPE-bilayers is smaller than that for DOPS and DOPC-membranes. The study was supported in part by RFBR, the Grant of the President of RF (#MK-1813.2012.4) and the Russian State Contract #8119 (MES, FTP, SSEPIR).

407-Pos Board B176
Too Much Charge Weakens Electrostatic Interactions between Charged Liposomes in Low Ionic-Strength Solutions
Joel A. Cohen[1], Ming Tzo Wei[2], H. Daniel Ou-Yang[2].
[1]University of the Pacific, San Francisco, CA, USA, [2]Lehigh University, Bethlehem, PA, USA.
Studies of the charge dependence of electrostatic interactions between charged colloidal particles in aqueous suspension have been hindered by a lack of controllability of the particle charge. However with liposomes, the particle charge can readily be controlled by the ratio of charged/neutral lipids. The nominal charge Z_0 of non-interacting liposomes can be verified by their electrophoretic mobility. In deionized suspensions, mutual repulsions produce an